UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 90907

CR NO. 57

OVER THE

SOUTH BRANCH OF THE BUFFALO RIVER

DISTRICT 4 - CLAY COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 52)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 90907, the East and West Abutments and Pier 1, were found to be in mostly good to at times fair condition. Typically, the timber piles exhibited minor checks up to ½ inch wide; however, several of the timber piles were also hollow with up to 50 percent section loss. The channel bottom around the substructure units was well established and appeared stable, with no evidence of significant scour and with no appreciable changes since the previous inspection, aside for some minor aggradation.

INSPECTION FINDINGS:

(A) The timber piles, caps, bracing, and abutment sheeting typically exhibited random minor checks up to ½ inch wide, and awl penetrations ranging from ½ to ¾ inch into the timber.

(B) The second timber pile from the downstream end of Pier 1 was hollow from 2 feet below to 2 feet above the waterline with 20 percent section loss.

(C) The downstream timber pile of Pier 1 was hollow from 3 feet below to 3 feet above the waterline with an estimated 50 percent section loss. Within the same area of the pile, the outer shell was soft with up to 2 inches of awl penetration.

(D) The second timber pile from the downstream end of the West Abutment was hollow from the waterline to 3 feet below with an estimated 50 percent section loss.

(E) The north end of the East Abutment pile cap was decayed with up to 1 foot of penetration. (This is beginning to affect the bearing capacity on the downstream pile.)

(F) The diagonal timber bracing was broken / missing on the east and west sides of Pier 1 on the three upstream timber piles.

(G) The two H-piles with a horizontal steel brace, which replaced the original upstream timber pile, exhibited light surface corrosion with minor pitting up to 1/32 inch deep.

RECOMMENDATIONS:

(A) Replace the missing lateral bracing on Pier 1 to re-establish the lateral stability of the structure.

(B) Monitor the timber piles that exhibited section loss during future inspections. A structural review should also be made to assess the need for replacement and/or helper piles at this time.

(C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 90907

Feature Crossed: South Branch of the Buffalo River

Feature Carried: CR No. 57

Location: District 4 - Clay County

Bridge Description: The bridge superstructure consists of a two span timber deck supported on multiple timber beams. The superstructure is supported by one timber pile pier and two timber pile abutments. No design drawings were provided.

2. INSPECTION DATA

Professional Engineer/Team Leader: Bradley A. Syler, P.E., S.E.

Dive Team: John J. Loftus, Valerie Roustan

Date: August 21, 2007

Weather Conditions: Cloudy, 70°F

Underwater Visibility: 1.0 foot

Waterway Velocity: 0.5 f.p.s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: East and West Abutments, and Pier 1.

General Shape: Pier 1 consisted of a single row of timber piles supporting a timber cap beam. The pier is braced with diagonal cross-bracing timbers. The upstream pile has been replaced with two steel H-piles. The abutments are comprised of timber piles with attached timber planks which form a vertical retaining wall (backwall) and two wingwalls.

Maximum Water Depth at Substructure Inspected: Approximately 4.9 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the timber pile cap on the south end of the West Abutment.

Water Surface: The waterline was approximately 7.1 feet below reference.
Assumed Waterline Elevation = 92.9.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 5

Item 61: Channel and Channel Protection: Code 5

Item 92B: Underwater Inspection: Code B/09/07

Item 113: Scour Critical Bridges: Code I/95

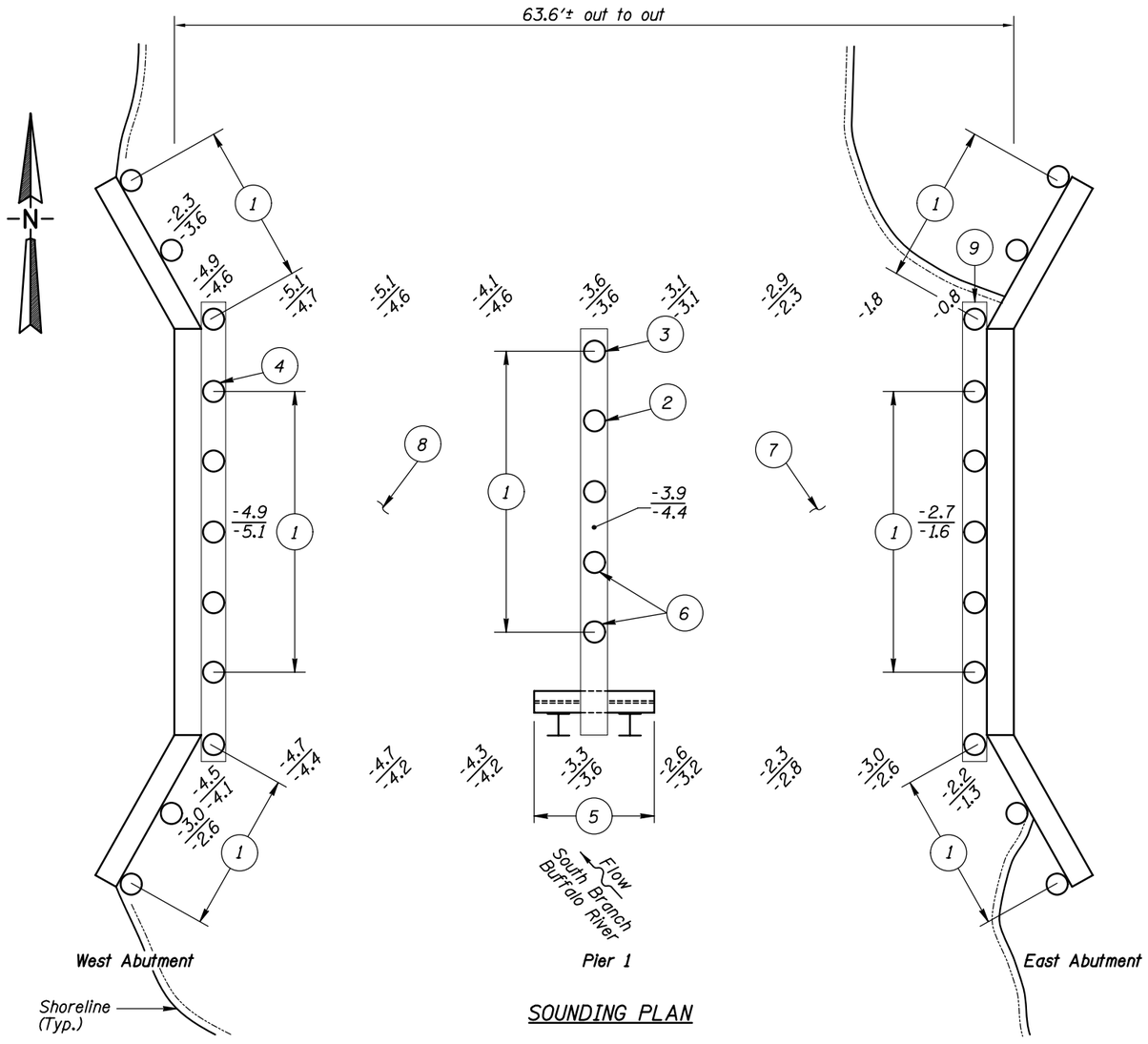
Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____Yes X No

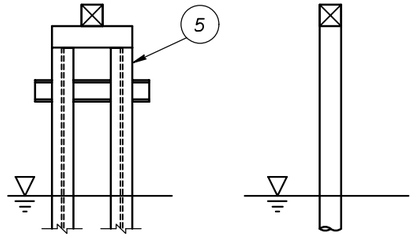
Photograph 1. View of East Abutment, Looking Northeast.

Photograph 2. View of Pier 1, Looking Southwest.

Photograph 3. View of West Abutment, Looking Southwest.



SOUNDING PLAN



UPSTREAM DOWNSTREAM

END VIEWS OF PIER 1

GENERAL NOTES:

1. Pier 1 and the East and West Abutments were inspected underwater.
2. At the time of inspection on August 21, 2007, the waterline was located approximately 7.1 feet below the top of the timber pile cap at the upstream end of the West Abutment. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 92.9.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The timber piles, caps, bracing, and abutment sheeting exhibited random minor checks up to an 1/2 of an inch wide and typical awl penetration between 1/2 and 3/4 of an inch into the timber.

(2) The second timber pile from the downstream end of Pier 1 was hollow from 2 feet below to 2 feet above the waterline with 20 percent section loss.

(3) The downstream timber pile of Pier 1 was hollow from 3 feet below to 3 feet above the waterline with 50 percent section loss. In the same area of the pile, the outer shell was soft with up to 2 inches of awl penetration.

(4) The second timber pile from downstream end on the west abutment was hollow from the waterline to 3 feet below with 50 percent section loss.

(5) The two steel H-piles with a horizontal steel brace, which replaced the original upstream timber pile, exhibited light surface corrosion with minor pitting up to 1/32 of an inch deep.

(6) The diagonal timber bracing was broken/missing on the east and west sides of Pier 1 on the three upstream timber piles.

(7) The channel bottom between Pier 1 and east abutment consisted of soft silt with up to 2 feet of probe rod penetration.

(8) The channel bottom consisted of silty clay with 1 foot of probe rod penetration.

(9) The North end of the East Abutment pile cap was decayed with up to 1 foot of penetration. (This is beginning to affect the bearing capacity on the downstream pile)

Legend

-2.0	Sounding Depth (8/21/07)
-5.2	Sounding Depth (10/29/02)
○	Timber Pile
I	Steel H-Pile

Note:

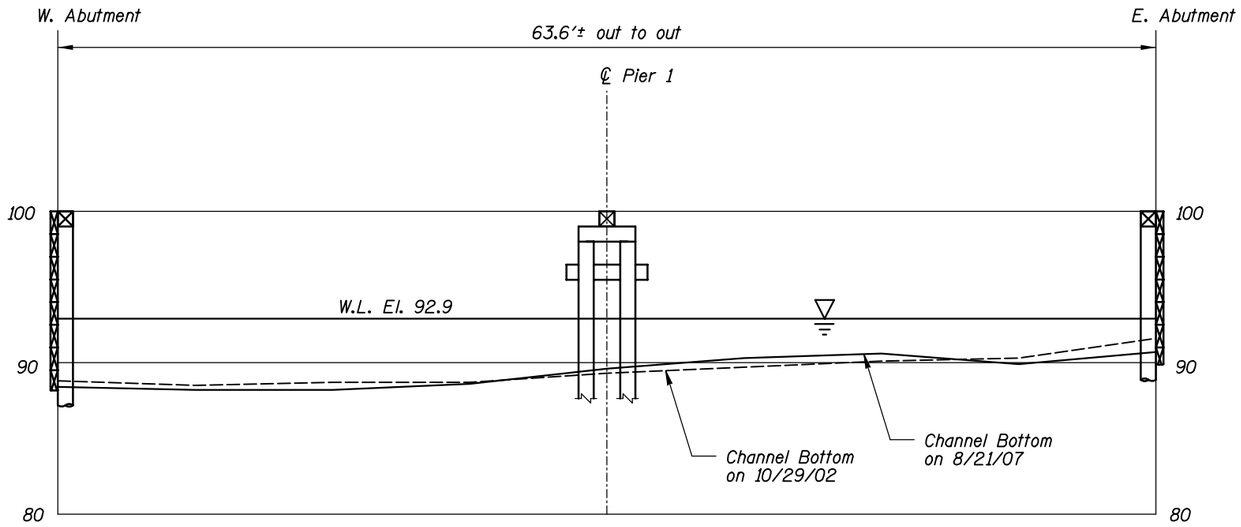
All soundings based on 2007 waterline location.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

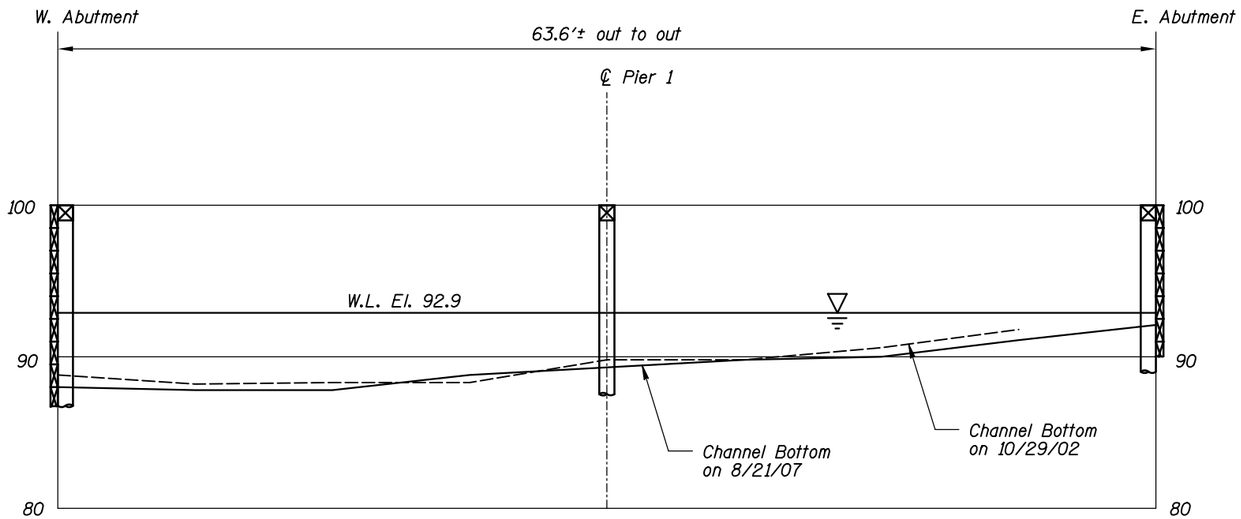
STRUCTURE NO. 90907
OVER THE SOUTH BRANCH OF THE BUFFALO RIVER
DISTRICT 4, CLAY COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: AUGUST, 2007
Checked By: MDK		Scale: NTS
Code: 52210052		Figure No.: 1



UPSTREAM FASCIA PROFILE
Vertical Scale: 1"=10'-0"



DOWNSTREAM FASCIA PROFILE
Vertical Scale: 1"=10'-0"

Note:

Refer to Figure 1 for General Notes.

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UNDERWATER BRIDGE INSPECTION

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UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com	Date: AUGUST, 2007
Checked By: MDK		Scale: NTS (U.O.N.)
Code: 52210052		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 21, 2007

ON-SITE TEAM LEADER: Bradley A. Syler, P.E., S.E.

BRIDGE NO: 90907 WEATHER: Cloudy, 70°F

WATERWAY CROSSED: South Branch of the Buffalo River

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

_____ OTHER _____

PERSONNEL: John J. Loftus, Valerie Roustan

EQUIPMENT: Scuba, Probe Rod, Lead Line, Sounding Pole, U/W Light, Scraper, Camera

TIME IN WATER: 12:15 p.m.

TIME OUT OF WATER: 12:40 p.m.

WATERWAY DATA: VELOCITY 0.5 f.p.s

VISIBILITY 1.0 foot

DEPTH 4.9 feet maximum the West Abutment

ELEMENTS INSPECTED: East and West Abutments, and Pier 1

REMARKS: Overall, the timber piles, caps, bracing, and abutment sheeting exhibited random minor checks up to ½ inch wide, and typical awl penetrations between ½ to ¾ inch into the timber. Three of the timber piles were hollow and had up to 50 percent section loss. The steel H-piles, which replaced the upstream timber pile of Pier 1, exhibited light surface corrosion with no section loss observed. The diagonal timber braces were broken / missing on the east and west sides of Pier 1 on the three upstream timber piles. The north end of the East Abutment pile cap was decayed with up to 1 foot of penetration (beginning to affect bearing on pile below). The channel bottom at the bridge appeared stable with no notable deficiencies.

FURTHER ACTION NEEDED: X YES _____ NO

Replace the missing lateral bracing on Pier 1 to re-establish the lateral stability of the structure.

Monitor the timber piles that exhibited section loss during future inspections. A structural review should also be made to assess the need for replacement and/or helper piles at this time.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 90907
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Bradley A. Syler, P.E., S.E.
WATERWAY CROSSED South Branch of the Buffalo River

INSPECTION DATE August 21, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	West Abutment	4.9’	6	7	N	8	N	6	8	5	N	N	5	N	N	6	N	N	N
	Pier 1	3.9’	5	N	N	8	5	5	8	N	N	N	8	N	N	5	N	N	N
	East Abutment	2.7’	7	7	N	8	N	7	8	7	N	N	7	N	N	7	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the timber piles, caps, bracing, and abutment sheeting exhibited random minor checks up to ½ inch wide, and typical awl penetrations between ½ to ¾ inch into the timber. Three of the timber piles were hollow and had up to 50 percent section loss. The steel H-piles, which replaced the upstream timber pile of Pier 1, exhibited light surface corrosion with no section loss observed. The diagonal timber braces were broken / missing on the east and west sides of Pier 1 on the three upstream timber piles. The north end of the East Abutment pile cap was decayed with up to 1 foot of penetration (beginning to affect bearing on pile below). The channel bottom at the bridge appeared stable with no notable deficiencies.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.